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CURRENT LITERATURE

BOOK REVIEWS

Evolution of the filicinean vascular system

Professor Tansley¹ has done well to gather under one cover his lectures on the vascular system of ferns, previously published in the *New Phytologist*. The attempt is made "to gather together the results that have accrued from the researches on the morphology of the vascular system of ferns which have been undertaken during the last few years, and to present these results from an evolutionary standpoint." The first lecture discusses various theories which have been advanced to account for the origin of the main phyla of Pteridophyta. The author favors the view of a direct derivation from Algae in which an alternation of generations had already been established. Accordingly, the sporophyte of pteridophytes would not correspond to that of bryophytes, in which an antithetic alternation of generations seems to have been worked out. The author admits that the presence of an archegonium in both mosses and ferns is an obstacle to this view. Assuming a monophyletic origin for pteridophytes, the view is advanced that the ancestral form was one with a radially organized axis having branches, some of which became specialized as leaves. These leaves were relatively large, and appear to have branched dichotomously; hence the derivation of Filicales from a lycopod form is not credited. It is even suggested that small-leaved forms, such as *Lycopodium*, may have been derived by reduction from megaphyllous ancestors. The whole scheme of phylogeny proposed is largely speculative, but such attempts will be welcomed by those who find difficulty in accepting BOWER'S well-known hypothesis.

In the second lecture the Botryopterideae are reviewed, and much scattered information on this group is rendered available. Proceeding from the protostelic condition exhibited by *Grammatopteris*, the complications shown by *Zygopteris* and other genera are discussed, and the conclusion is reached that this group stands near the ancestors of the different phyla of fern-like plants. Among the Hymenophyllaceae the mode of exit of the leaf-traces lends support to the author's view of the identical nature of leaf strand and stem stele. In discussing this family, as well as the Gleicheniaceae and Schizaeaceae, BOODLE'S work is freely drawn upon and is presented from the evolutionary standpoint. Phylogeny as indicated by the stele is compared with that inferred from the sporangia, and a general correspondence is claimed, though the latter criterion is considered to be the more reliable.

In the sixth lecture the evolution of a protostele into a solenostele (siphonostele) is considered with reference to the examples found in the foregoing families.

¹ TANSLEY, A. G., Lectures on the evolution of the filicinean vascular system. *New Phytologist* reprint no. 2. Paper. 8vo. pp. 144. Cambridge: The Author. 1908. 38s. 6d.

Although no explicit statement is made, the reader is apparently left to infer that there are two modes of origin of a hollow stele: (1) one in which the central tracheids are replaced by parenchyma (*Schizaea*), (2) one in which fundamental tissue passes into "pockets" at the leaf gaps and becomes continuous with the tissue in contiguous pockets (*Alsophila*). Although the latter view of the origin of "pith" is essentially that of JEFFREY, no mention of the fact is made in the text, but such reference is relegated to the preface, where the author disclaims adherence to this view. The evolution of solenostely into dictyostely, and finally into polycyclcy is clearly traced, and the complicated condition found in Marattiaceae is adequately illustrated by diagrams from various sources.

Concerning the Osmundaceae, the conclusion is reached that the stele does not represent a reduced type, but shows a gradual progression from the condition seen in Botryopterideae, from which group the Osmundaceae have probably been derived. The recent work of KIDSTON and Gwynne-VAUGHAN on fossil members of the group is quoted in defense of this position.

In a succeeding lecture the evolution of the leaf-trace is outlined, and it is shown that elaborations of the primitively simple curved trace follow upon increase in the leaf-surface, and in turn bring about increasing complexity in the central cylinder of the stem. According to the author's view "the leaf-trace leads, and the stele follows, in the course of evolution." The ontogeny of the vascular system is next summarized, and a final lecture is devoted to a comparison of the vascular system of various phyla. The criticisms of JEFFREY's primary groups Lycopida and Pteropsida have already been dealt with in this journal².—M. A. CHRYSLER.

The American Breeders' Association

The fourth annual report of the American Breeders' Association³ is, in a number of features, a decided improvement over previous volumes. The same high standard of matter is maintained as in previous reports, but there is more of it; it is printed on better paper; and contains numerous fine half-tone engravings. Unlike many publications which are more or less influenced by practical considerations, the articles presented in the reports of the American Breeders' Association appear to suffer no diminution of scientific value because of the large contingent of practical breeders among its membership and on its programs. Almost every phase of practical and theoretical breeding of plants and animals, as well as two interesting reports upon eugenics, the new science of improvement of the human race, are included. Papers of importance from the standpoint of the practical plant-breeder include several upon the production of disease-resistance in various plants by W. A. ORTON, P. K. BLINN, and H. L. BOLLEY;

² JEFFREY, E. C. Are there foliar gaps in the Lycopida? *BOT. GAZETTE* 46:241-258. *pls. 17, 18.* 1908.

³ Report of the American Breeders' Association. Vol. IV. pp. 373. *pls. 3,* figs. 74. 1908.